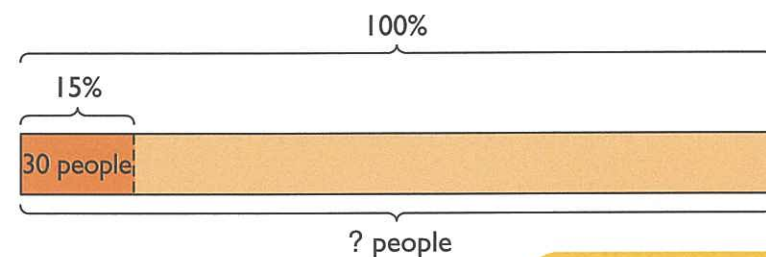


Word Problems (I)

- 1 15% of the number of people who attended a workshop wore T-shirts. If 30 people wore T-shirts, find the total number of people who attended the workshop.



15% of the whole is equal to 30 people.

The whole is 100%, which is the total number of people.



From the model, we see that:

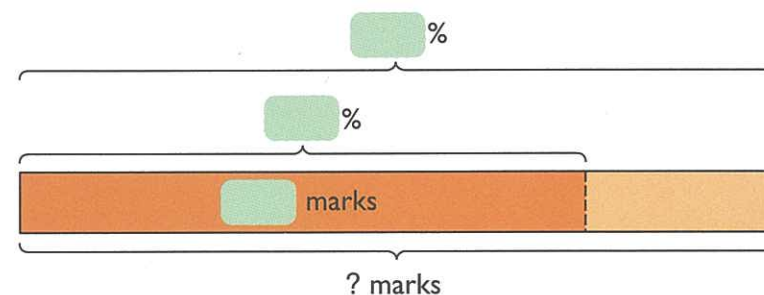
$$15\% \rightarrow 30 \text{ people}$$

$$1\% \rightarrow 30 \div 15 = 2 \text{ people}$$

$$100\% \rightarrow 100 \times 2 = 200 \text{ people}$$

200 people attended the workshop.

- 2 Linda scored 66 marks for her Mathematics test. This was 75% of the total marks. Find the total marks for the Mathematics test.



From the model, we see that:

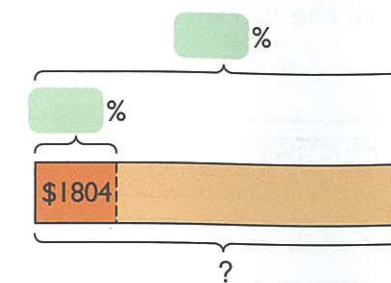
$$75\% \rightarrow 66 \text{ marks}$$

$$1\% \rightarrow 66 \div 75 = \frac{66}{75} \text{ marks}$$

$$100\% \rightarrow 100 \times \frac{66}{75} = 88 \text{ marks}$$

The total marks for the Mathematics test was 88.

- 3 22% of Serena's monthly salary was spent on renting a house. The rental for the house was \$1804 per month. What was Serena's monthly salary?



From the model, we see that:

$$22\% \rightarrow \$1804$$

$$1\% \rightarrow \$1804 \div 22 = \$82$$

$$100\% \rightarrow 100 \times \$82 = \$8200$$

Serena's monthly salary was \$8200.

- 4 Vanita bought a watch and she paid \$15.40 GST. The GST was 7% of the selling price. How much did the watch cost before GST?

$$7\% \rightarrow \$15.40$$

$$1\% \rightarrow \$15.40 \div 7 = \$2.20$$

$$100\% \rightarrow 100 \times \$2.20 = \$220$$

The watch cost \$220 before GST.


- 5 Aiqin invested some money in a fixed deposit account. The interest was 5% of the amount of money she invested. At the end of the year, Aiqin received \$72.25 as interest. How much did Aiqin invest in the account?

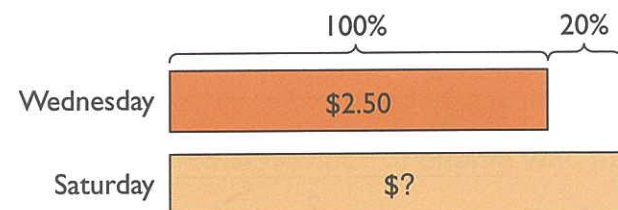
$$5\% \rightarrow \$72.25$$

$$1\% \rightarrow \$72.25 \div 5 = \$14.45$$

$$100\% \rightarrow 100 \times \$14.45 = \$1445$$

Aiqin invested \$1445 in the account.

- 6  Ruth bought some fish and paid \$2.50 per kg at a market on Wednesday. On Saturday, she bought the same type of fish. Its price had increased by 20%. What was the price per kg of the fish on Saturday?



Method 1

$$100\% \rightarrow \$2.50$$

$$1\% \rightarrow \$2.50 \div 100 = \$\left(\frac{2.50}{100}\right)$$

$$120\% \rightarrow 120 \times \$\left(\frac{2.50}{100}\right) = \$3$$

The price of the fish on Saturday was \$3 per kg.

On Saturday, the price of the fish was 120% of the price of the fish on Wednesday.



Method 2


$$20\% \text{ of } \$2.50 = \frac{20}{100} \times \$2.50 = \$0.50$$

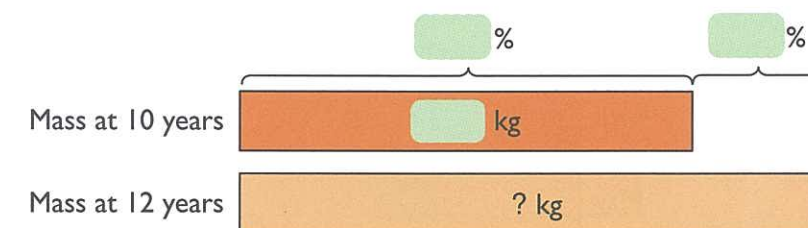
$$\$2.50 + \$0.50 = \$3$$

The price of the fish on Saturday was \$3 per kg.

First, find the increase in price. The increase was 20% of the price on Wednesday.



- 7  When Jimmy was 10 years old, his mass was 36 kg. Two years later, his mass had increased by 30%. Find Jimmy's mass when he was 12 years old.



Method 1

Jimmy's mass when he was 12 years old was % of his mass when he was 10 years old.

$$100\% \rightarrow 36 \text{ kg}$$

$$1\% \rightarrow 36 \div 100 = \text{ kg}$$

$$\text{ \%} \rightarrow \text{} \times \text{} = \text{ kg}$$

Jimmy's mass when he was 12 years old was kg.

Method 2

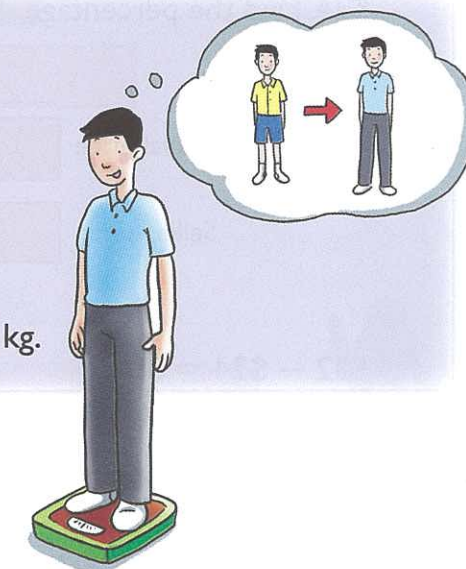
$$100\% \rightarrow 36 \text{ kg}$$

$$1\% \rightarrow 36 \div 100 = \text{ kg}$$

$$30\% \rightarrow 30 \times \text{} = \text{ kg}$$

$$36 \text{ kg} + \text{ kg} = \text{ kg}$$

Jimmy's mass when he was 12 years old was kg.



- 8  The price of a new car was \$43 750 in April. However, the price of the car was reduced by 5% in May. Find the price of the car in May.



In May, the price of the car was % as compared to the price of the car in April.


$$100\% \rightarrow \$ \text{ }$$

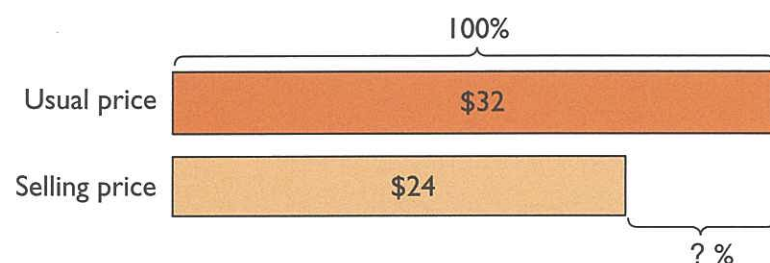
$$1\% \rightarrow \$ \text{ } \div 100 = \$ \text{ }$$

$$\text{ \% } \rightarrow \$ \text{ } \times \text{ } = \$ \text{ }$$

The price of the car at the end of the month was \$.



- 9  The usual price of a Merlion souvenir was \$32. Sharon sold the souvenir for \$24. Find the percentage discount.



$$\$32 - \$24 = \$8$$

The discount was \$8.

$$\$32 \rightarrow 100\%$$

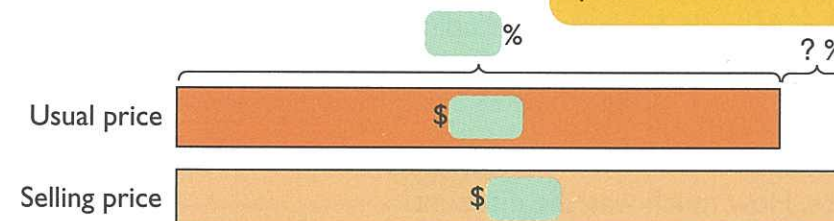
$$\$1 \rightarrow \frac{100}{32}\%$$

$$\$8 \rightarrow 8 \times \frac{100}{32}\% = 25\%$$

The percentage discount was 25%.

- 10  The usual price of a toy was \$64. Mr Soon sold the toy to Dennis for \$72. Find the percentage increase in price.

We are comparing the selling price with the usual price. So, we take the usual price as %.




The increase in price was \$.

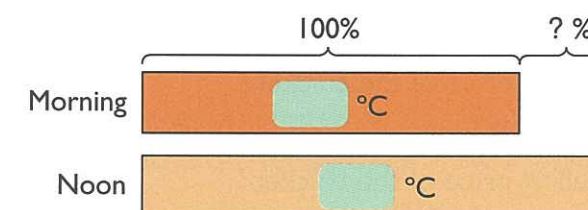
$$\$ \text{ } \rightarrow 100\%$$

$$\$ \text{ } \rightarrow 8 \times \frac{100}{64}\% = \text{ } \%$$

The percentage increase in price was %.



- 11  The temperature in a town was 28 °C in the morning. At noon, the temperature was 35 °C. Find the percentage increase in temperature.



The increase in temperature was °C.

$$\frac{7}{28} \times 100\% = \text{ } \%$$

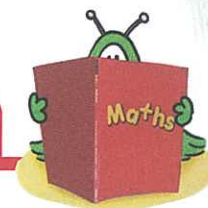
The percentage increase in temperature was %.









Let's Practise! 6b

Solve these word problems. Show your working clearly.

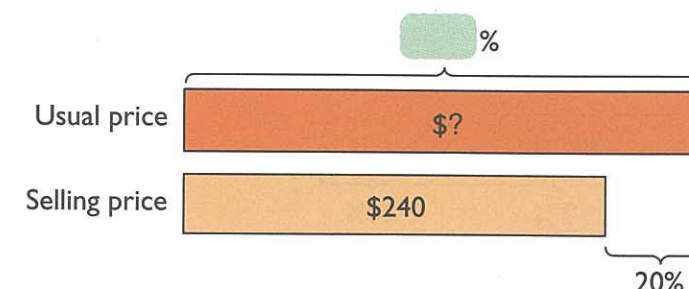
- 1 Wendy collects Singapore and Malaysia coins. She has 24 Singapore coins. Her Singapore coins are 80% of her coin collection. How many coins did she collect altogether?



- 2  Aisha had a piece of ribbon. She cut out 4.5 m from the ribbon to make ribbon flowers. The percentage of the ribbon used was 62%. How much ribbon had she left? Express your answer correct to 2 decimal places.
- 3  Sue paid a total of \$511.46 for a meal including 7% GST on the cost of the meal. How much was the cost of the meal without GST?
- 4 During the Great Singapore Sale, Mr Chen bought a digital camera for \$810. This was 90% of the usual price. How much was the discount?
- 5 The room temperature was 24 °C in the morning. Five hours later, the room temperature had increased by 12%.
 - a What was the increase in the temperature of the room?
 - b What was the room temperature five hours later?
- 6  Mrs Soong bought a new refrigerator. When she turned on the refrigerator, the temperature in it was 16.2 °C. After 10 hours, the temperature dropped by 75%. What was the temperature of the refrigerator after it was switched on for 10 hours?
- 7 The selling price of 1 kg of chicken was \$5.40. This was 10% less than the usual price.
 - a What was the usual price of the chicken?
 - b If the chicken was sold at a price that was 8% more than the usual price, what would be the selling price of the chicken?
- 8  The usual price of a plasma television set was \$8999. After a year, the selling price of the same type of plasma television set was \$4200. Find the percentage decrease in price. Round off your answer to the nearest whole number.
- 9  In January, the price of a kilogram of potatoes at Supermarket X was \$3.20. In May, a kilogram of the same type of potatoes cost \$2.99. Find the percentage decrease in price. Express your answer correct to 1 decimal place.
- 10  The COE price for a small car in January was \$16 525. In November, the COE price had increased to \$24 725. Find the percentage increase in the COE. Express your answer correct to 1 decimal place.

Word Problems (2)

- 1 Michelle paid \$240 for a wallet. She had been given a 20% discount on the usual price. What was the usual price of the wallet?

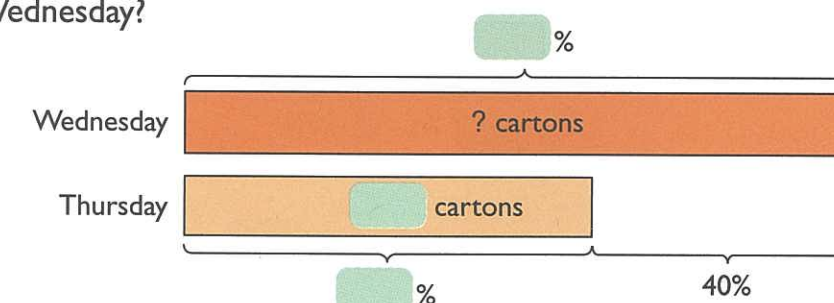


The usual price was %.




$100\% - 20\% = 80\%$
 The selling price was 80% of the usual price.
 $80\% \rightarrow \$240$
 $1\% \rightarrow \$\left(\frac{240}{80}\right) = \3
 $100\% \rightarrow 100 \times \$3 = \$300$
 The usual price of the wallet was \$300.

- 2 Sam sold 75 cartons of apples on Thursday. This was 40% less than the number of cartons of apples that he sold on Wednesday. How many cartons of apples did Sam sell on Wednesday?

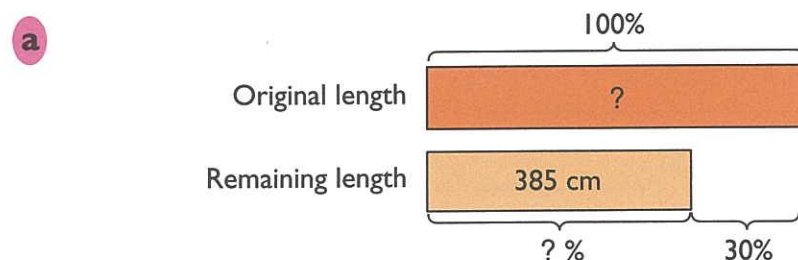


The number of cartons of apples Sam sold on Thursday is % of the number of cartons that he sold on Wednesday.

$\text{green box} \% \rightarrow \text{green box cartons}$
 $1\% \rightarrow \frac{\text{green box}}{100} = \text{green box cartons}$
 $100\% \rightarrow 100 \times \text{green box} = \text{green box cartons}$
 Sam sold cartons of apples on Wednesday.

- 3  Mr Wee had a metal chain. He cut off 30% of the chain to make a belt. The remaining length of metal chain was 385 cm long. He then cut off 25% of the remaining metal chain to make a necklace.

- a What was the original length of the metal chain?
b What was the remaining length of the metal chain after making the necklace?



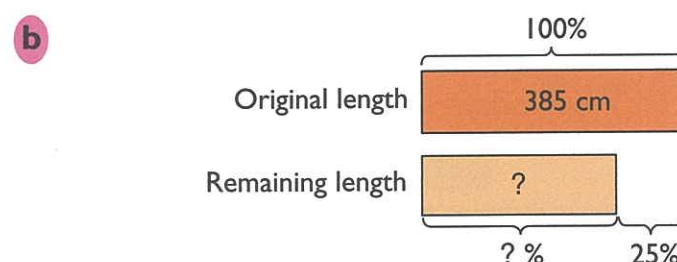
$$100\% - 30\% = 70\%$$

$$70\% \rightarrow 385 \text{ cm}$$

$$1\% \rightarrow 385 \div 70 = 5.5 \text{ cm}$$

$$100\% \rightarrow 100 \times 5.5 = 550 \text{ cm}$$

The original length of the metal chain was 550 cm.



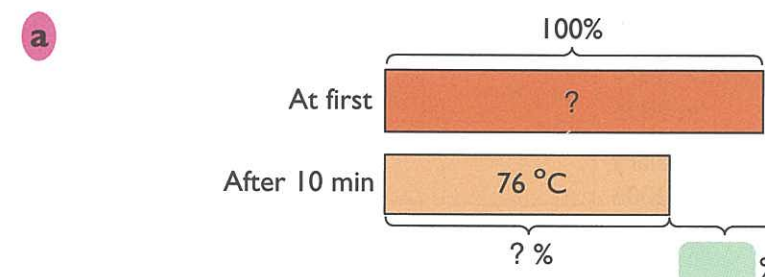
$$100\% - 25\% = 75\%$$

$$75\% \times 385 = 288.75$$

The remaining length of the metal chain after making the necklace was 288.75 cm.

- 4 A flask of hot water was left to cool. After 10 minutes, the temperature had decreased by 24% to 76°C. After another 5 minutes, the temperature of the water decreased further by 20%.

- a What was the original temperature of the flask of water?
b What was the final temperature after 15 minutes?



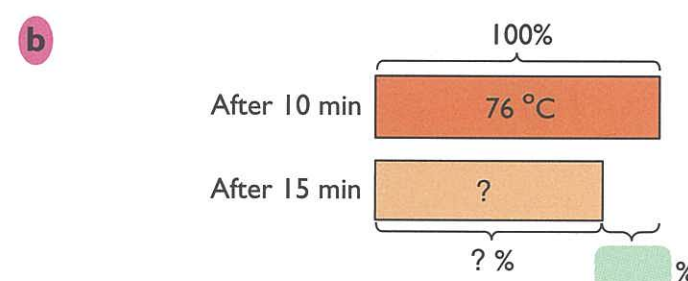
$$100\% - 24\% = 76\%$$

$$76\% \rightarrow 76^\circ\text{C}$$

$$1\% \rightarrow 76 \div 76 = 1^\circ\text{C}$$

$$100\% \rightarrow 100 \times 1 = 100^\circ\text{C}$$

The original temperature was 100°C.

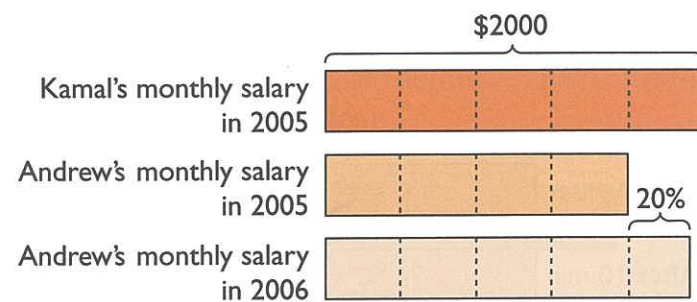


$$100\% - 20\% = 80\%$$

$$80\% \times 76^\circ\text{C} = 60.8^\circ\text{C}$$

The final temperature after 15 minutes was 60.8°C.

- 5 In 2005, Kamal's monthly salary was \$2000. Andrew's monthly salary was $\frac{4}{5}$ of Kamal's monthly salary. In 2006, Andrew's monthly salary was increased by 20%. Find the increase in Andrew's monthly salary.



$$\begin{aligned}\text{Andrew's monthly salary in 2005} &= \frac{4}{5} \times \$2000 \\ &= \$1600\end{aligned}$$

$$100\% \rightarrow \$1600$$

$$1\% \rightarrow \$1600 \div 100 = \$16$$

$$20\% \rightarrow 20 \times \$16 = \$320$$

The increase in Andrew's monthly salary was \$320.

We are comparing Andrew's monthly salary in 2005 with his monthly salary in 2006. So, we take his monthly salary in 2005 as 100%.



- 6 On Monday, Mrs Chang bought 12 kg of fish and Mrs Lee bought $\frac{5}{4}$ as much fish as Mrs Chang. On Tuesday, Mrs Lee bought 30% more fish than she bought on Monday. Find the increase in the mass of fish Mrs Lee bought on Tuesday.



$$\begin{aligned}\text{Mass of fish Mrs Lee bought on Monday} &= \frac{5}{4} \times 12 \\ &= 15 \text{ kg}\end{aligned}$$

$$100\% \rightarrow 15 \text{ kg}$$

$$1\% \rightarrow \frac{15}{100} \text{ kg}$$

$$30\% \rightarrow 30 \times \frac{15}{100} = 4.5 \text{ kg}$$

We take the mass of fish Mrs Lee bought on Monday as 100%.

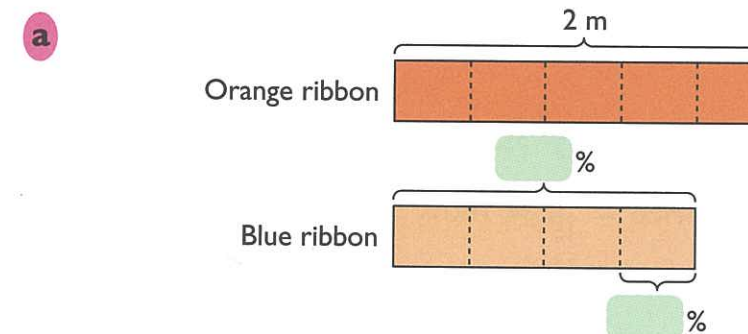


The increase in the mass of fish Mrs Lee bought on Tuesday was 4.5 kg.

- 7 Linda had an orange ribbon and a blue ribbon. The orange ribbon was 2 m long. The blue ribbon was $\frac{4}{5}$ as long as the orange ribbon. Linda cut out 25% of the blue ribbon.

a What was the length of the blue ribbon before it was cut?

b Find the length of blue ribbon that Linda cut.

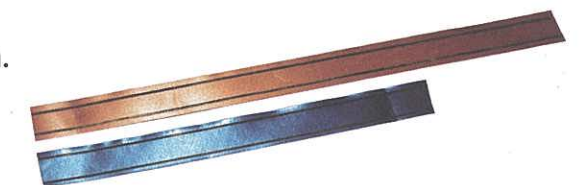



$$\frac{4}{5} \times 2 = 1.6$$

The blue ribbon was 1.6 m long before it was cut.

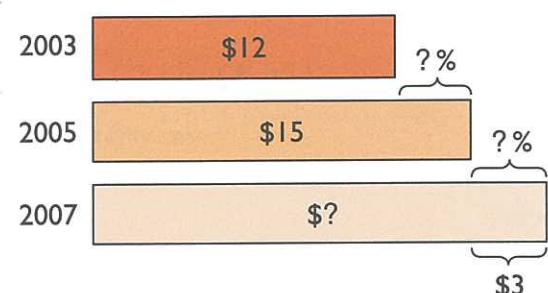
$$25\% \times 1.6 = 0.4$$

Linda cut 0.4 m of the blue ribbon.



- 8  The usual price of a Science textbook in 2003 was \$12. In 2005, the price of the textbook increased to \$15. In 2007, the price of the textbook was \$3 more than the price of the textbook in 2005.

- a Find the percentage increase in the price of the book from 2003 to 2005.
b Find the percentage increase in the price of the book from 2005 to 2007.



- a Increase in price of book from 2003 to 2005 = \$15 - \$12
= \$3

$$\text{Percentage increase} = \frac{3}{12} \times 100\% = 25\%$$


The percentage increase in the price of the book from 2003 to 2005 was 25%.

- b Percentage increase in price = $\frac{3}{15} \times 100\%$
= 20%

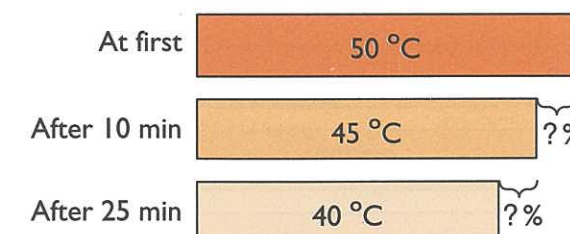
The percentage increase in the price of the book from 2005 to 2007 was 20%.

We are comparing the price of the book in 2005 with the price of the book in 2007. So we take the price of the book in 2005 as 100%.



- 9  The temperature of the water in a glass was 50 °C at first. After 10 minutes, it dropped to 45 °C. Another 15 minutes later, the temperature had dropped to 40 °C.

- a Find the percentage decrease in temperature after the first 10 minutes.
b What was the percentage decrease in temperature from 45 °C to 40 °C? Express your answer correct to 1 decimal place.



- a Decrease in temperature = 50 °C - 45 °C
= 5 °C

$$\frac{5}{50} \times 100\% = 10\%$$

The percentage decrease in temperature after the first 10 minutes was 10%.

- b Decrease in temperature = 45 °C - 40 °C
= 5 °C

$$\frac{5}{45} \times 100\% \approx 11.1\%$$

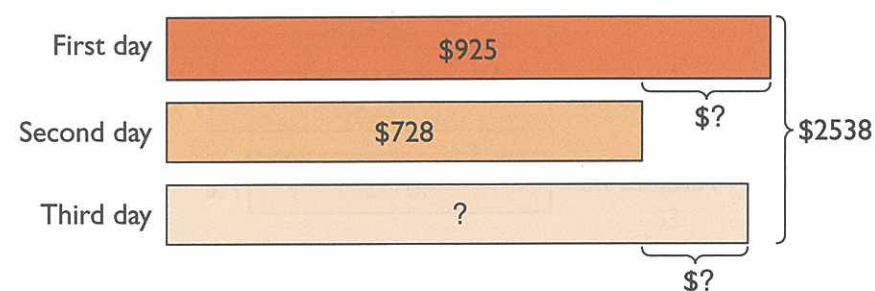
The percentage decrease in temperature from 45 °C to 40 °C was 11.1%.

10



Shaun collected \$925 on the first day of a funfair. On the second day, he collected \$728. By the third day, he had collected a total of \$2538.

- a What was the percentage decrease in the amount of money collected from the first day to the second day? Express your answer correct to 1 decimal place.
- b Find the percentage increase or decrease in the amount collected from the second day to the third day. Express your answer correct to 1 decimal place.



- a Decrease in amount of money collected = $\$925 - \728
= \$

$$\text{Percentage decrease} = \frac{\text{Decrease}}{\text{Original Amount}} \times 100\%$$

$$= \frac{\text{Decrease}}{925} \times 100\%$$

$$\approx \text{ } \%$$

The percentage decrease in the amount of money collected from the first day to the second day was %.

- b Amount collected on the third day = $\$2538 - \$925 - \$728$
= \$

$$\text{Increase in amount of money collected} = \$ - \$$$

$$= \$$$

$$\text{Percentage Increase} = \frac{\text{Increase}}{\text{Original Amount}} \times 100$$

$$= \frac{\text{Increase}}{728} \times 100$$

$$\approx \text{ } \%$$

The percentage in the amount of money collected from the second day to the third day was %.



Jason and Ravi worked out the following:

In a science experiment, Muthu had to record the temperature change of some liquid in a flask. The temperature of the liquid in the flask was 50°C at first. After 10 minutes, the temperature of the liquid dropped to 40°C . Another 20 minutes later, the temperature of the liquid had dropped to 30°C .

Find the percentage decrease in temperature from 40°C to 30°C .

Jason's answer:

$$40^\circ\text{C} - 30^\circ\text{C} = 10^\circ\text{C}$$

$$\frac{10}{50} \times 100\% = 20\%$$

The percentage decrease in temperature was 20%.

Ravi's answer:

$$40^\circ\text{C} - 30^\circ\text{C} = 10^\circ\text{C}$$


$$\frac{10}{40} \times 100\% = 25\%$$

The percentage decrease in temperature was 25%.

- a Whose answer is incorrect?
- b Explain why.





- 1 Yee San paid \$120 for a luggage bag. She had been given a discount of 20% on the usual price. What was the usual price of the luggage bag?
- 2 In 2007, the number of subscribers for Magazine A was 475 and the number of subscribers for Magazine B was $\frac{4}{5}$ of the number of subscribers for Magazine A. In 2008, the number of subscribers for Magazine B increased by 35%. Find the total number of subscribers for Magazine B in 2008.
- 3 Riyani had 20 lollipops. Suzie had $\frac{7}{2}$ of the number of lollipops Riyani had. Suzie gave 25 lollipops to her friends. Find the percentage decrease in the number of lollipops Suzie had. Express your answer correct to 2 decimal places.
- 4 The temperature at noon was 32 °C. In the evening, it had dropped to 28 °C. At midnight, the temperature was 24 °C.
 - a Find the percentage decrease in temperature from noon to evening.
 - b Find the percentage decrease in temperature from evening to midnight. Express your answer correct to 2 decimal places.
- 5  Ali deposited \$10 000 into a fixed deposit account. At the end of the first year, the amount of money in the account had increased to \$10 450. At the end of the second year, he had \$10 900 in the fixed deposit account.
 - a Find the percentage increase in his money at the end of the first year.
 - b Find the percentage increase in his money from the end of the first year to the end of the second year. Express your answer correct to 1 decimal place.


WB 6A, p 133
Practice 3

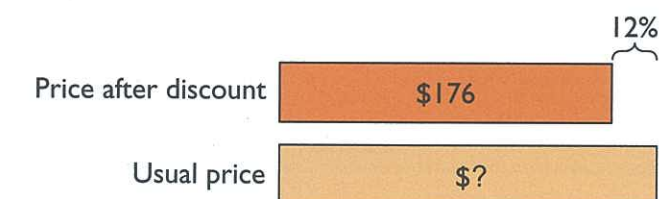


You have learnt to:

- find the whole given a part and the percentage
- find a part given the whole and the percentage of the other part
- solve word problems by finding percentage increase and percentage decrease
- solve word problems involving percentage, discount and GST

Let's revise!

- 1  During the Great Singapore Sale, Kathy paid \$176 for an oven at a discount of 12%. What was the usual price of the oven?



$$100\% - 12\% = 88\%$$

The selling price was 88% of the usual price.

$$88\% \rightarrow \$176$$

$$1\% \rightarrow \$2$$

$$100\% \rightarrow \$200$$

The usual price of the oven was \$200.